

SUBJECT: Cessna Minority Position on Draft AC/ACJ 25.903(e)

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TO: P. Sallee

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The Cessna minority position on this AC/ACJ addressing in-flight restarting is as follows:

A. Revise Section 4.1 paragraph discussing 25.903(e) compliance as follows for accuracy:

Change " many turboprop airplanes utilize electric starters" to "many smaller turboprop and turbojet/turbofan airplanes utilize electric starters".

Change "and utilize pneumatic starters" to "and larger turboprop and turbojet/turbofan engines utilize pneumatic starters:..

B. In Section 5, based on the definitions of relight and restart in a) and b), change "Relight Envelope" to "Restart Envelope" in c) and d) to better reflect the intended meaning.

C. For Section 7 Condition I, Minimum Clean configuration speed is not a well defined or universally recognized speed. It is not believed that it is intended or appropriate to require extremely low speeds such as in or near the stickshaker regime. Since the airplane will be out of the airport environment, by virtue of the allowable 2500 foot altitude loss, and since the restart attempt may not occur until a second engine shutdown following an earlier first engine shutdown, it is requested that Minimum Clean Configuration speed be changed to V_{ENR} .

D. In Section 7, Condition I, clarification is requested as to whether the demonstration altitude should be the most critical altitude selected by the applicant, or whether multiple altitude demonstrations are required.

E. In Section 7, clarification is requested as to whether Condition III consists of both a climb and descent condition, or either a climb and descent condition, whichever is determined to be more critical.

- F. In Section 7, Conditions II, III (descent), and IV, the power or thrust at shutdown needs to be clarified. It could be interpreted as either idle or typical descent power or thrust.
- G. In Section 7, para 4) allows consideration of other factors, such as dedicated engine shutdown indication, aircraft design features which minimize the potential for inadvertent shutdown, or automatic relight and automatic sub-idle recovery systems, for evaluation of crew recognition time for condition IV. Other than dedicated engine shutdown indication, these factors have little to do with crew recognition time, rather they prevent the shutdown or the need for a flight crew initiated restart if they work properly. The intent of this guidance is unclear. Since these provisions can provide superior safety to crew procedures in low altitude situations, it is recommended that they be recognized as an alternative to low altitude all engine restart, providing they are appropriately addressed per 25.901(c)/25.1309. These factors and the comments above are equally applicable to condition I.
- H. In Section 7, Condition IV, the 250 KCAS maximum airspeed should be deleted as unnecessary and redundant to other requirements, in particular the altitude loss. The 250 KCAS speed limit may not be applicable in all parts of the world, and is certainly a trivial operational consideration in an all engine out emergency situation compared to the necessity of a restart. It is recognized that higher speeds may not be practical for all aircraft, while still meeting the other requirements, but this should be an application specific issue rather than a blanket requirement.
- I. In Section 8.1, the statement that sufficient tests must be carried out to validate the start envelope reliably is likely to lead to disagreement as to what is sufficient. An additional related issue is whether the engine is required to start successfully the first time, every time, especially at high altitudes exceeding the AC requirements and/or when starting with latent failures present such as an ignitor failure. The following additional guidance is suggested to address these issues.

Three demonstrated starts are normally sufficient at critical points in the starting envelope, however only one need be a simulated all engine out situation where altitude loss is measured. Critical points generally involve low airspeeds, high altitudes, or high ITT/EGT at start initiation. One demonstrated start is sufficient at other points. More than one start attempt, either automatic or manual, is acceptable, provided that the specified altitude loss is not exceeded, that adequate crew recognition of the unsuccessful start attempt is available, and that any external energy source used is not depleted. Multiple start attempts in situations where compliance with altitude loss requirements is marginal may require additional demonstrations to ensure consistency.

- J. In Section 8.3, The guidance for rapid relight starts with 30 second recognition delay and idle power at engine shutdown should be revised to be consistent with the rapid relight conditions specified for Section 7 Condition I takeoff scenario.